REMARKS

Claims 21-31 are now pending in the application. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

DRAWINGS

The drawings stand objected to under 37 CFR 1.83(a) for allegedly failing to show certain features recited in claims 21, 22, 23, 24, 26, and 27. This objection is respectfully traversed. Applicant submits that all the features of the claimed invention are duly shown in the drawings as noted below.

Regarding Claim 21, the claimed "plurality of adhered caps each including a main body having a concave surface" is disclosed in paragraph [0078] lines 1-3 and paragraph [0080] lines 1-6. The description reads with reference to FIGS. 5 and 6. FIG. 5 shows a plurality of caps 73 and FIG. 6 shows the details of each cap.

[0078] As shown in FIG. 5, the suction unit 71 includes: a cap unit 72 having twelve caps 73 which adhere to the respective function liquid droplet ejection heads 31; a lift mechanism 91 which allows the caps 73 to separate from and contact the function liquid droplet ejection heads 31 by lifting up and down the cap unit 72; ejectors 101 for sucking the function liquid through the adhered caps 73; a suction tube (system) 111 for connecting the respective caps 73 to the ejectors 101; and a supporting member 131 for supporting the cap unit 72.

[0080] As shown in FIG. 6, each of the caps 73 includes a cap main body 81 and a cap holder 82. The cap main body 81 is urged upward by two springs 87 and held by

the cap holder 82 so as to be able to move slightly in a vertical direction. In an upper surface of the cap main body 81, a concave part 83 is formed, which includes each of the two arrays of ejection nozzles 39 of the function liquid droplet ejection head 31. In a peripheral portion of the concave part 83, a seal packing 84 is fitted. An absorber 85 is laid on a bottom of the concave part 83 while being pressed by a pressing frame 86. During the suction of the function liquid droplet ejection head 31, the seal packing 84 is pressed against the nozzle forming surface 38 of the function liquid droplet ejection head 31 and is adhered thereto. Thus, the nozzle forming surface 38 is sealed so as to include the two arrays of ejection nozzles 39 therein. An air open valve (relief valve) 88 is provided in each of the caps 73 so as to open to atmosphere at the bottom side of the concave part 83 (see FIG. 6). At the final stage of the suction operation, the relief valve 88 is opened to atmosphere air and thus the function liquid contained in the absorber 85 can also be sucked.

Regarding Claim 22, the "seal packing is seated around a peripheral portion of said concave surface" is disclosed in paragraph [0080] lines 6-7 and illustrated in Fig. 6. Further, paragraph [0079] also has a description to the effect that the respective caps 73 can be adhered to (or brought into close contact with) the corresponding function liquid droplet ejection heads 31 (see Fig. 5).

[0080] (see above)

[0079] As shown in FIG. 5, in the cap unit 72, the twelve caps 73 are disposed on a cap base 74 corresponding to the positions of the twelve function liquid droplet ejection heads 31 mounted on the head unit 21. The respective caps 73 can be

adhered to (or brought into close contact with) the corresponding function liquid droplet ejection heads 31.

Regarding Claim 23 and 24, the "one of the said adhered caps is adhered to a function droplet ejection head" is described in paragraph [0096] lines 4-11 with reference to FIG. 8 and the lift mechanism 91 in FIG. 5. Particularly, on lines 9-11, a description is given to the effect that the respective caps 73 are adhered to the corresponding function liquid droplet ejection heads 31. FIG. 8 is a schematic representation and FIGS. 5 and 6 and is submitted to be sufficient for the person skilled in the art to understand the claim.

[0096] With reference to FIG. 8, description will be given regarding a case of performing the suction of the function liquid droplet ejection heads 31 by using the suction unit 71, as an example of the control by the control means 6. When performing the suction of the function liquid droplet ejection heads 31, the control means 6 (first control means) drives the foregoing X/Y moving mechanism 51 and first allows the head unit 21 to face the suction unit 71 disposed on the common machine table 13. Thereafter, the lift mechanism 91 of the suction unit 71 is driven to raise the cap unit 72 to the first position, and the respective caps 73 are adhered to the corresponding function liquid droplet ejection heads 31.

Regarding Claim 26, the "first lift cylinder and second lift cylinder" are described in paragraph [0081] by adding reference numerals 92 and 93 to FIG. 5. Even though some minute details are not perfectly clear in FIG. 5, this kind of ordinary mechanism

can easily be understood by the skilled person even with this kind of simple representation. This should particularly hold true when considering 37 CFR 1.83 which specifies:

> "However, conventional features disclosed in the description and claims, where their detailed illustration is not essential for a proper understanding of the invention, should be illustrated in the drawing in the form of a graphical drawing system or a labeled representation (e.g., a labeled rectangular box)."

The lift cylinder is submitted to fall under the classification requiring no detailed illustration.

[0081] The lift mechanism 91 is formed of air cylinders and includes two lift cylinders 92 and 93 having different strokes from each other. A selective operation of both the lift cylinders 92 and 93 can freely switch a lifted position of the cap unit 72 between a first position which is relatively high, and a second position which is relatively low. When the cap unit 72 is at the first position, each cap 73 is adhered to each function liquid droplet ejection head 31 and, when the cap unit 72 is at the second position, a narrow gap is formed between the function liquid droplet ejection head 31 and the cap 73.

Regarding Claim 27, the "plurality of suction tubes" is described in paragraph [0084] lines 1-3 as "branched sucking tubes 113 (suction pipelines) which are obtained by dividing the sucking tube 112 into multiple (twelve) branches." Since FIG. 8 is a schematic representation, only a representative embodiment is illustrated. Such an illustration will be sufficient for the skilled person, and particularly in view of the above Patent Rules.

[0084] The suction tube (system) 111 includes a sucking tube 112 and branched sucking tubes 113 (suction pipelines) which are obtained by dividing the sucking tube 112 into multiple (twelve) branches. By using the branched sucking tubes 113, the caps 73 and the ejectors 101 are connected to each other. In the liquid droplet ejection apparatus 1 of this embodiment, the respective caps 73 also serve as function liquid trays which catch the function liquid ejected by the flushing operations of the function liquid droplet ejection heads 31 during a non-ejection period of the function liquid, that is, when the ejection of the function liquid toward the workpiece W is temporarily stopped. In the sucking tube 112, a suction pump 114 for sucking the function liquid ejected by the flushing through the caps is provided. As shown in FIG. 8, a three-way valve 115 is provided in the sucking tube 112 upstream of the suction pump 114. To the three-way vale 115, a discharge tube 116 is connected, which has one end connected to a recycling tank 162 for guiding the working fluid and function liquid discharged from the ejectors 101 to the recycling tank 162.

REJECTION UNDER 35 U.S.C. § 112

Claims 21-31 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. This rejection is respectfully traversed. Notwithstanding, Applicant elects to amend Claim 21 to recite "said cap unit comprising" at the beginning of line 5 so as to read

> "said cap unit comprising a plurality of adhered caps each including a main body ..."

Accordingly, this rejection should be moot. Applicant also notes that the Examiner questions whether the Applicant is claiming the subcombination of a suction unit or the combination of a suction unit and a liquid droplet ejection apparatus.

Referring to the specification and drawings, paragraph [0068] clearly explains that:

> "the liquid droplet ejection apparatus 1 (with reference to FIGS. 1 and 2) includes:
>
> ejection means 2 for ...;
> maintenance mans 3 for ...;
> liquid supply/recovery means 4 for ...; and
> air supply means 5 for ..."

Subsequently, paragraph [0075] clearly explains that:

> "the maintenance means 3 includes
>
> a flushing unit 61,
> a suction unit 71 and
> a wiping unit 141 (see FIG. 1)"

From the above, the skilled person will understand that the "suction unit 71" is only a part of an entire apparatus (a complete machine) by the name of the "liquid droplet ejection apparatus 1." Therefore, there can be theoretically and actually no such a thing as a "combination" of only a part (of a complete machine) and the complete machine itself.

A.W. Deller's "Patent Claims" cites the Supreme Court's opinion to the effect that:

> "A patent on the combination embodied in the complete machine, without the allowance of the subcombination claims, would not, ..., prevent the free use of the subcombination.... Hence denial of a patent on the subcombination would deprive the inventor of the benefit of the exclusive right to use the subcombination ..." (§ 312, page 867)

Applicant respectfully submits that in view of the foregoing it is clear that Claim 21 is a subcombination claim claiming only a part (suction unit) in a complete machine (liquid droplet ejection apparatus). The same applies to the uncertainty regarding claims 23 and 24.

REJECTION UNDER 35 U.S.C. § 102

Claim 21 stands rejected under 35 U.S.C. § 102(b) as being unpatentable over Reed (U.S. Pat. No. 5,797,546). This rejection is respectfully traversed.

Applicant respectfully notes that the technical field in which the claimed invention is used is vastly different than that of Reed. This invention is directed towards a suction unit for a liquid droplet ejection apparatus which handles function liquid droplets. Reed, on the other hand, is a so-called two-component mixing and dispensing system.

As listed by the Examiner, the constituting elements such as a cap unit, a support member, a lift mechanism, a plurality of ejectors, and a suction system have the cursory appearance to be similar to those of the claimed invention. However, what is meant by each of these terms in Reed is quite different from that of the claimed invention particularly in regard to significance (and resultant structural details) and function.

In this regard, Applicant refers to Deller's §78, page 140 which reads to the effect that:

> "While it is true that the preamble ..., it should not for that reason be ignored. Each of the elements of the combination should be read in the light of this clause and should be modified by it. ... yet it may so affect the enumerated elements as to give life and meaning and vitality to them, ..."

If a comparison is made between Reed and claim 21 in view of the above, Reed can be seen to be different from the subject matter of claim 21 in that:

a) Although a "cap unit" is provided for each of the two components (resin and catalyst), there is no disclosure in that each of them is adhered.

b) The object to be sucked by the ejector is not a function liquid but a resin and catalyst, respectively.

c) The object of transporting by the suction tube system is not the function liquid and the origin of transportation is not the plurality of adhered caps.

The above and other differences are due to the difference in the technical field in which the subject matter is used. For example, the claimed invention was made to solve the problem as described in paragraph [0006] lines 12-14. The claim elements of the combination should be "modified" by it as noted in Deller. Here, the term "modify" must mean that the difference between Reed's elements and those of claim 21 should not be compared with each other without consideration to the preamble (i.e., technical field).

In view of the foregoing, reconsideration and withdrawal of this rejection are respectfully requested.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider and withdraw all presently outstanding rejections. It is

believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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